The carbon balance of an alpine peatland in Northern Italy

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It is well known that peatlands store a vast amount of carbon in their soil and that with the ever-changing climate the stability of these carbon pools is under threat. But peatlands in high altitude regions are studied far less than peatlands in high latitude regions. In the Alps there are numerous small peatlands, that are threatened by increasing temperatures at high altitudes. This study reports on three years of eddy covariance measurements of CO_2 and CH_4 at a peatland site in the Italian Alps with the aim of increasing our comprehension on the functioning of small-scale peatlands in mountainous regions and to investigate their vulnerabilities.

The Monte Bondone peatland (latitude 46º01' N, longitude 11º02' E) is a fen, located in the lowest area of a catchment basin on an alpine plateau at an elevation of 1563 masl, near Trento in the North-East of Italy. The average annual precipitation in the 2000-2013 period is about 1200 mm with an average air temperature of 5.1 °C. The snow-free period typically lasts from early May to late October-November.

The peatland acted as a slight source of CO_2 (16.2 ± 66.0 g C-CO_2 m^{-2} yr^{-1}) during the 2012-2014 period, while the methane fluxes, measured between January and October 2014, showed a very small release (1.7 ± 0.11 g C-CH_4 m^{-2}).

Further work will focus on the use of the GEOTOP model to replicate the water table and stream inflow and outflow from the peatland to analyze their effect on the carbon fluxes. Modelled stream flow will also be used to estimate the dissolved organic carbon export from the system.